

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
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M A S T E R   M I N I M U M   E Q U I P M E N T   L I S T

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\*\*\*\*\*  
\* For Part 91 Operations Only \*  
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DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
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MASTER MINIMUM EQUIPMENT LIST

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## Log of Revisions

REV.NO.	DATE	PAGE NUMBERS	INITIALS
1	02/01/2007	HIGHLIGHTS OF REV., DEFINITIONS	
1	02/01/2007	GUIDELINES	
1	02/01/2007	21-1, 25-1	

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Control Page

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Highlights of Change	IV	1	02/01/2007
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	VIII	6	01/31/1995
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	X	6	01/31/1995
	XI	6	01/31/1995
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Preamble	XIII	1	07/05/1990
	XIV	1	07/05/1990
Guidelines for (O) & (M) Procedures	XV	1	02/01/2007
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34	34-1	ORIGINAL	10/25/1993
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77	77-1	ORIGINAL	10/25/1993

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### Highlights of Change

Cover page: Modified address and added fax number.

Guidelines for (O) & (M) Procedures: Modified (M) procedure for ATA 21-2.

Eliminated (M) procedures for ATA 21-4, 24-3, 30-1 and 52-2.

ATA 21-2 Added (M) symbol in column 4.

ATA 21-3 Provided relief for Air Conditioner.

ATA 25-6 Provided relief for Electronic News Gathering (ENG) Equipment.

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## Definitions

## 1. System Definitions.

System numbers are based on the Air Transport Association (ATA) Specification Number 100 and items are numbered sequentially.

- a. "Item" (Column 1) means the equipment, system, component, or function listed in the "Item" column.
- b. "Number Installed" (Column 2) is the number (quantity) of items normally installed in the aircraft. This number represents the aircraft configuration considered in developing this MMEL. Should the number be a variable (e.g., passenger cabin items) a number is not required.
- c. "Number Required for Dispatch" (Column 3) is the minimum number (quantity) of items required for operation provided the conditions specified in Column 4 are met.

NOTE: Where the MMEL shows a variable number required for dispatch, the MEL must reflect the actual number required for dispatch or an alternate means of configuration control approved by the Administrator.

- d. "Remarks or Exceptions" (Column 4) in this column includes a statement either prohibiting or permitting operation with a specific number of items inoperative, provisos (conditions and limitations) for such operation, and appropriate notes.
- e. A vertical bar (change bar) in the margin indicates a change, addition or deletion in the adjacent text for the current revision of that page only. The change bar is dropped at the next revision of that page.

2. "Airplane/Rotorcraft Flight Manual" (AFM/RFM) is the document required for type certification and approved by the responsible FAA Aircraft Certification Office. The FAA approved AFM/RFM for the specific aircraft is listed on the applicable Type

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Certificate Data Sheet.

3. "As required by FAR" means that the listed item is subject to certain provisions (restrictive or permissive) expressed in the Federal Aviation Regulations operating rules. The number of items required by the FAR must be operative. When the listed item is not required by FAR it may be inoperative for time specified by repair category.

4. Each inoperative item must be placarded to inform and remind the crewmembers and maintenance personnel of the equipment condition.

NOTE: To the extent practical, placards should be located adjacent to the control or indicator for the item affected; however, unless otherwise specified, placard wording and location will be determined by the operator.

5. "-" symbol in Column 2 and/or Column 3 indicates a variable number (quantity) of the item installed.

6. "Deleted" in the remarks column after a sequence item indicates that the item was previously listed but is now required to be operative if installed in the aircraft.

7. "ER" refers to extended range operations of a two-engine airplane which has a type design approval for ER operations and complies with the provisions of Advisory Circular 120-42A.

8. "Federal Aviation Regulations" (FAR) means the applicable portions of the Federal Aviation Act and Federal Aviation Regulations.

9. "Flight Day" means a 24 hour period (from midnight to midnight) either Universal Coordinated Time (UCT) or local time, as established by the operator, during which at least one flight is initiated for the affected aircraft.

10. "Icing Conditions" means an atmospheric environment that may cause ice to form on the aircraft or in the engine(s).

11. Alphabetical symbol in Column 4 indicates a proviso (condition or limitation) that must be complied with for

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operation with the listed item inoperative.

12. "Inoperative" means a system and/or component malfunction to the extent that it does not accomplish its intended purpose and/or is not consistently functioning normally within its approved operating limit(s) or tolerance(s).

13. "Notes:" in Column 4 provides additional information for crewmember or maintenance consideration. Notes are used to identify applicable material which is intended to assist with compliance, but do not relieve the operator of the responsibility for compliance with all applicable requirements. Notes are not a part of the provisos.

14. Inoperative components of an inoperative system:  
Inoperative items which are components of a system which is inoperative are usually considered components directly associated with and having no other function than to support that system. (Warning/caution systems associated with the inoperative system must be operative unless relief is specifically authorized per the MMEL).

15. "(M)" symbol indicates a requirement for a specific maintenance procedure which must be accomplished prior to operation with the listed item inoperative. Normally these procedures are accomplished by maintenance personnel; however, other personnel may be qualified and authorized to perform certain functions. Procedures requiring specialized knowledge or skill, or requiring the use of tools or test equipment should be accomplished by maintenance personnel. The satisfactory accomplishment of all maintenance procedures, regardless of who performs them, is the responsibility of the operator. Appropriate procedures are required to be published as part of the operator's manual or MEL.

16. "(O)" symbol indicates a requirement for a specific operations procedure which must be accomplished in planning for and/or operating with the listed item inoperative. Normally these procedures are accomplished by the flight crew; however, other personnel may be qualified and authorized to perform certain functions. The satisfactory accomplishment of all procedures, regardless of who performs them, is the responsibility of the operator. Appropriate procedures are

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### Definitions

required to be published as a part of the operator's manual or MEL.

NOTE: The (M) and (O) symbols are required in the operator's MEL unless otherwise authorized by the Administrator.

17. "Deactivated" and "Secured" means that the specified component must be put into an acceptable condition for safe flight. An acceptable method of securing or deactivating will be established by the operator.

18. "Visual Flight Rules" (VFR) is as defined in FAR Part 91. This precludes a pilot from filing an Instrument Flight Rules (IFR) flight plan.

19. "Visual Meteorological Conditions" (VMC) means the atmospheric environment is such that would allow a flight to proceed under the visual flight rules applicable to the flight. This does not preclude operating under Instrument Flight Rules.

20. "Visible Moisture" means an atmospheric environment containing water in any form that can be seen in natural or artificial light; for example, clouds, fog, rain, sleet, hail, or snow.

21. "Passenger Convenience Items" means those items related to passenger convenience, comfort or entertainment such as, but not limited to, galley equipment, movie equipment, ash trays, stereo equipment, overhead reading lamps, etc.

22. Repair Intervals: All users of an MEL approved under FAR 121, 125, 129 and 135 must effect repairs of inoperative systems or components, deferred in accordance with the MEL, at or prior to the repair times established by the following letter designators:

Category A. Items in this category shall be repaired within the time interval specified in the remarks column of the operator's approved MEL.

Category B. Items in this category shall be repaired within three (3) consecutive calendar days (72 hours), excluding the day the malfunction was recorded in the aircraft maintenance

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record/logbook. For example, if it were recorded at 10 a.m. on January 26th, the three day interval would begin at midnight the 26th and end at midnight the 29th.

Category C. Items in this category shall be repaired within ten (10) consecutive calendar days (240 hours), excluding the day the malfunction was recorded in the aircraft maintenance record/logbook. For example, if it were recorded at 10 a.m. on January 26th, the 10 day interval would begin at midnight the 26th and end at midnight February 5th.

Category D. Items in this category shall be repaired within one hundred and twenty (120) consecutive calendar days (2880 hours), excluding the day the malfunction was recorded in the aircraft maintenance log and/or record.

The letter designators are inserted adjacent to Column 2.

23. Electronic fault alerting system - General

New generation aircraft display system fault indications to the flight crew by use of computerized display systems. Each aircraft manufacturer has incorporated individual design philosophies in determining the data that would be represented. The following are customized definitions (specific to each manufacturer) to help determine the level of messages affecting the aircraft's dispatch status. When preparing the MEL document, operators are to select the proper Definition No. 23 for their aircraft, if appropriate.

a. BOEING (B-757/767, B-747-400, B-777)

Boeing airplanes equipped with Engine Indicating and Crew Alerting Systems (EICAS), provide different priority levels of system messages (WARNING, CAUTION, ADVISORY, STATUS and MAINTENANCE). Any messages that affects airplane dispatch status will be displayed at a STATUS message level or higher. The absence of an EICAS STATUS or higher level (WARNING, CAUTION, ADVISORY) indicates that the system/component is operating within its approved operating limits or tolerances.

System conditions that result only in a maintenance level message, i.e. no correlation with a higher level EICAS message,

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do not affect dispatch and do not require action other than as addressed within an operators standard maintenance program.

b. DOUGLAS (MD-11)

Some Douglas aircraft are equipped with an alerting function which is a subsystem within the Electronic Instrument System (EIS). The alerting function provides various levels of system condition alerts (WARNING, CAUTION, ADVISORY, MAINTENANCE and STATUS).

Alerts that affect aircraft dispatch will include WARNING, CAUTION, STATUS or MAINTENANCE level. MAINTENANCE alerts are displayed on the status page of the EIS display panel under the maintenance heading.

A MAINTENANCE alert on the EIS indicates the presence of a system fault which can be identified by the Central Fault Display System (CFDS) interrogation. The systems are designed to be fault tolerant, however, for any MAINTENANCE alert, the MEL must be verified for dispatch purposes.

c. AIRBUS (A-300-600, A-310, A-320/319/321, A-330, A-340)

Airbus aircraft equipped with Electronic Centralized Aircraft Monitoring (ECAM) provide different levels of system condition messages (WARNING, CAUTION, STATUS, and ADVISORY). A-320/319/321, A-330, and A-340 also provide MAINTENANCE status messages.

Any message that effects airplane dispatchability will normally be at the WARNING, CAUTION or STATUS level. MAINTENANCE messages (A-320/319/321, A-330, and A-340 only) are also indicated on ECAM Status Page below the white Maintenance label.

A MAINTENANCE status (Class II) message on ECAM indicates the presence of a system fault which can be identified by CFDS (A-320/319/321) or CMS (A-330/A-340) interrogation. The systems are designed to be fault tolerant, however for any MAINTENANCE status (Class II) message, the A-320/319/321 MEL must be verified for dispatch capability. For the A-330 and A-340, MAINTENANCE status messages do not affect dispatch.

d. FOKKER (FK-100)

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Fokker aircraft are equipped with Multi Function Display System (MFDS) which provides electronic message referring to the different priority levels of system information (WARNING (red), CAUTION (amber), AWARENESS (cyan) AND STATUS (white). Any messages that affects aircraft dispatch will be at the WARNING, CAUTION or AWARENESS level. In these cases the MEL must be verified for dispatch capability and maintenance may be required.

System conditions that only require maintenance are not presented on the flight deck. These maintenance indications/messages may be presented on the Maintenance & Test Panel (MAP) or the Centralized Fault Display Unit (CFDU) and by dedicated Built In Test Evaluation (BITE) of systems.

24. "Administrative control item" means an item listed by the operator in the MEL for tracking and informational purposes. It may be added to an operator's MEL by approval of the Principal Operations Inspector provided no relief is granted, or provided conditions and limitations are contained in an approved document (i.e. Structural Repair Manual, airworthiness directive, etc.). If relief other than that granted by an approved document is sought for an administrative control item, a request must be submitted to the Administrator. If the request results in review and approval by the FOEB, the item becomes an MMEL item rather than an administrative control item.

25. "\*\*\*\*" symbol in Column 1 indicates an item which is not required by regulation but which may have been installed on some models of aircraft covered by this MMEL. This item may be included on the operator's MEL after the approving office has determined that the item has been installed on one or more of the operator's aircraft. The symbol, however, shall not be carried forward into the operator's MEL. It should be noted that neither this policy nor the use of this symbol provide authority to install or remove an item from an aircraft.

26. "Excess Items" means those items that have been installed that are redundant to the requirements of the FARs.

27. "Day of Discovery" is the calendar day an equipment/instrument malfunction was recorded in the aircraft

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maintenance log and or record. This day is excluded from the calendar days or flight days specified in the MMEL for the repair of an inoperative item of equipment. This provision is applicable to all MMEL items, i.e., categories "A, B, C, and D."

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Preamble  
(Effective 07/05/1990)

This preamble is applicable to, and will be included in, master minimum equipment lists (MMEL) issued under the provisions of Section 91.30(a) NEW Section 91.213(a)(2). It is not applicable to MMEL's issued under the provisions of Parts 121, 125, 129, and 135 of the FAR.

Except as provided in Section 91.30(d) NEW Section 91.213(d), or under the provisions of an approved MMEL, all equipment installed on an aircraft in compliance with the airworthiness standards or operating rules must be operative. Experience has shown that with the various levels of redundancy designed into modern aircraft, operation of every system or component installed may not be necessary when the remaining equipment can provide an acceptable level of safety.

An MMEL is developed by the FAA, with participation by the aviation industry, to improve aircraft utilization and thereby provide more convenient and economic air transportation for the public. The FAA-approved MMEL includes only those items of equipment which the Administrator finds may be inoperative and yet maintain an acceptable level of safety by appropriate conditions and limitations. The MMEL and FAA-issued letter of authorization are used as an MEL by an operator and permit operation of the aircraft with inoperative equipment.

The MMEL includes all items of installed equipment that are permitted to be inoperative. Equipment required by the FAR, and optional equipment in excess of FAR requirements, is included with appropriate conditions and limitations. For each listed item, the installed equipment configuration considered to be normal for the aircraft is specified. Items of equipment installed on aircraft (except for passenger convenience items such as galley equipment and passenger entertainment devices), such as "TCAS," windshear detection devices, and ground proximity warning systems (GPWS) that are in excess of what is required, and are not listed on the MMEL, must be operational for dispatch unless MMEL relief is sought through the FSDO having jurisdiction for the operator. If MMEL relief is sought, the operator must notify the FSDO who will make a request of the FOEB to convene and consider adding the equipment to the MMEL. The operator may then dispatch with the equipment disabled, or rendered inoperative, in accordance with all FAR. It is incumbent on the operator to endeavor to determine if O and/or M procedures for that equipment must be developed. If so, any procedures developed must comply with all FAR. Procedures developed to use the MMEL must not conflict with either the aircraft flight manual limitations, emergency procedures, or with airworthiness directives (AD), all of which take precedence over the MMEL and those procedures.

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Preamble  
(Effective 07/05/1990)

Suitable conditions and limitations in the form of placards, maintenance procedures, crew operating procedures, and other restrictions, as necessary, are required to be accomplished by the operator to ensure that an acceptable level of safety is maintained. Those procedures should be developed from guidance provided in the manufacturer's aircraft flight and/or maintenance manuals, manufacturer's recommendations, engineering specifications, and other appropriate sources. Procedures must not be contrary to any FAR. Wherever the statement "as required by FAR" appears in the MMEL, the operator must either list the specific FAR by part and section and carry the FAR on board the aircraft or specify the requirements and/or limitations to conduct the flight in accordance with the appropriate FAR.

The MMEL is intended to permit operations with inoperative items of equipment for the minimum period of time necessary until repairs can be accomplished. It is important that repairs be accomplished at the earliest opportunity in order to return the aircraft to its design level of safety and reliability. Inoperative equipment in all cases must be repaired, or inspected and deferred, by qualified maintenance personnel at the next required inspection Section 91.165(c), NEW Section 91.405(c). The repair intervals indicated by the Letters A, B, and C inserted adjacent to column 2 are NOT applicable to this MMEL.

The MMEL provides for release of the aircraft for flight with inoperative equipment. When an item of equipment is discovered to be inoperative, it is reported by making an entry in the aircraft maintenance records. The item is then either repaired or deferred per the MMEL or other approved means acceptable to the Administrator prior to further operation. In addition to the specific MMEL conditions and limitations, determination by the operator that the aircraft is in condition for safe operations under anticipated flight conditions must be made for all items of inoperative equipment. When these requirements are met, the aircraft may be considered airworthy and returned to service. Operators are responsible for exercising the necessary operational control to ensure that an acceptable level of safety is maintained. When operating with multiple inoperative items, the interrelationship between those items, and the effect on aircraft operation and crew workload, must be considered. Operators are expected to establish a controlled and sound repair program, including the parts, personnel, facilities, procedures, and schedules to ensure timely repair.

WHEN USING THE MMEL, COMPLIANCE WITH THE STATED INTENT OF THE PREAMBLE, DEFINITIONS, CONDITIONS, AND LIMITATIONS SPECIFIED IN THE MMEL IS REQUIRED.

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Guidelines for (O) & (M) Procedures

21-2 (M) Procedure to secure Cabin Heating System. |

24-2 (M) Procedure to disconnect battery and secure electrical  
cables.

28-2 (M) Procedure to disconnect the auxiliary fuel tank lines and cap  
the openings.

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		1.	2. NUMBER INSTALLED			3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
SYSTEM & SEQUENCE NUMBERS	ITEM						
-----							
21	AIR CONDITIONING						
1.	Fresh Air Vent	C	1	0		May be inoperative provided the vent is secured open.	
2.	Cabin Heating System	C	1	0		(M) May be inoperative provided the valve is secured to the off position.	
3.	Air Conditioner	C	-	0			
***							

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		1.	2. NUMBER INSTALLED			
SYSTEM & SEQUENCE NUMBERS	ITEM			3. NUMBER REQUIRED FOR DISPATCH		
-----					4. REMARKS OR EXCEPTIONS	
23	COMMUNICATIONS					
1.	Communications System: (FM, HF, UHF, VHF, etc.)	C	-	0	As required by FAR.	
2.	Cabin ICS System ***	C	-	0		
3.	External Loud *** Speaker	C	-	0		

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SYSTEM & SEQUENCE NUMBERS		1.	2. NUMBER INSTALLED		3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
		ITEM				
24 ELECTRICAL POWER						
1.	Alternator Low Voltage Light	B	1	0		May be inoperative provided ammeter is operative.
2.	Battery (Second) ***	C	-	0	(M)	May be inoperative provided: a) Battery is disconnected and secured, and b) Battery remains installed. OR c) Battery is removed, and d) Appropriate ballast is installed. OR e) Battery is removed, and f) Weight and balance is revised.

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SYSTEM & SEQUENCE NUMBERS		1.	2. NUMBER INSTALLED		3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
		ITEM				
25 EQUIPMENT/FURNISHINGS						
1.	Passenger Seat Belts/Shoulder Harness	C	-	0		One required for each occupied seat. If belt is inoperative or missing, seat must be blocked and placarded.
2.	Passenger Convenience Item(s)	C	-	0		Passenger Convenience Items, as expressed in this MMEL, are those related to passenger convenience, comfort, or entertainment such as, but not limited to, cup holders, ash trays, overhead reading lamps, etc. Items addressed elsewhere in this document shall not be included. (M) and (O) procedures may be required and included in operator's appropriate document.
3.	Cargo Suspension System	C	-	0		
4.	Emergency Locator Transmitter (ELT)	C	-	0		As required by FAR.
5.	Sonic Locator	C	-	0		
6.	Electronic News Gathering (ENG) Equipment	D	-	0		May be inoperative provided system is deactivated and secured. (M) and/or (O) procedures may be required and included in the operator's appropriate document.

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1.		2. NUMBER INSTALLED		3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
SYSTEM & SEQUENCE NUMBERS	ITEM				
28 FUEL					
1. Fuel Quantity Gage	B	1	0		(O)May be inoperative provided: a) the Aux tank is operative b) the flight is initiated with full Main and Aux tanks, and c) flight time does not exceed 2 hours.
2. Auxiliary Fuel Tank	C	-	0		(M)May be inoperative provided: a) Aux tank is empty and disconnected, and b) The fuel gage is operative.

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SYSTEM & SEQUENCE NUMBERS		1.	2. NUMBER INSTALLED		3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
		ITEM				
31 INDICATING/RECORDING SYSTEMS						
1.	Clock, Displaying Hours, Minutes and Seconds, with Sweep Second Pointer or Electric Digital Clock.	C	1	0		
2.	Hour Meter	C	-	0		(O)May be inoperative provided alternate means is utilized for recording time in service.
3.	Elapsed Timer ***	C	-	0		
4.	Aircraft/Engine *** Monitoring System.	C	-	0		

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SYSTEM & SEQUENCE NUMBERS	ITEM	1.		2. NUMBER INSTALLED		3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
33	LIGHTS						
1.	Position Light System	C	1	0			May be inoperative for day.
2.	Anti-Collision System	C	1	0			May be inoperative for day.
3.	Landing Light	C	2	0			May be inoperative for day.
4.	Cockpit Instrument Lighting System(s)	B	-	0			May be inoperative provided: a) Sufficient lighting is available to make each required instrument, control and other device for which it is provided easily readable, b) Direct rays and reflections do not impair visibility either inside or outside the aircraft, c) Lighting intensity can be controlled or preset to a satisfactory level for the expected flight condition, d) Lighting configuration at dispatch is acceptable to the pilot.
5.	Cabin Lighting System	C	1	0			
6.	Cockpit *** Utility Light	C	-	0			
7.	Strobe Light *** System	C	-	0			
8.	Search Light ***	C	-	0			

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		ITEM				
33 LIGHTS						
9.	External	C	-	0		
***	Utility Light					
10.	Supplemental	C	-	0		
***	Lighting					
	System					

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SYSTEM & SEQUENCE NUMBERS		1.	2. NUMBER INSTALLED			3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
34 NAVIGATION							
1. ***	Gyroscopic Rate of Turn with Slip Indicator	C	-	0		As required by FAR.	
2. ***	Gyroscopic Bank and Pitch Indicator	C	-	0		As required by FAR.	
3. ***	Directional Gyro	C	-	0		As required by FAR.	
4. ***	Vertical Speed Indicator	C	-	0		As required by FAR.	
5. ***	ATC Transponder	C	-	0		As required by FAR.	
6. ***	Navigation System (VOR, ILS, LORAN, GPS, marker beacon, DME, etc.)	C	-	0		As required by FAR.	
7. ***	Altitude Encoder	C	-	0		As required by FAR.	
8. ***	RMI	C	-	0			

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1.		2. NUMBER INSTALLED		3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
SYSTEM & SEQUENCE NUMBERS	ITEM				
-----					
65	ROTORS				
1.	Rotor Brake System C	1	0		(O)May be inoperative provided a check is performed to determine the main rotor is free to rotate.

## MASTER MINIMUM EQUIPMENT LIST

FEDERAL AVIATION ADMINISTRATION

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SYSTEM & SEQUENCE NUMBERS		1.	2. NUMBER INSTALLED		
ITEM			3. NUMBER REQUIRED FOR DISPATCH		
			4. REMARKS OR EXCEPTIONS		
71	POWERPLANT				
1.	Electronic Engine	C	1	0	*
***	RPM Governor				

## U.S. DEPARTMENT OF TRANSPORTATION

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1.		2. NUMBER INSTALLED		
SYSTEM & SEQUENCE NUMBERS	ITEM	3. NUMBER REQUIRED FOR DISPATCH		
-----		4. REMARKS OR EXCEPTIONS		
77	ENGINE INDICATING			
1.	Tachometer, Engine A	1	0	May be inoperative for up to three days provided: a) Rotor tachometer is operative, and b) Aircraft shall not depart an airport where repairs or replacement can be made.